

Review Article

Self-induced nail disorders

Shikha Bansal, MD, DNB.¹ , Prathibha Kuchana, MBBS.¹ , Dhaarna Wadhwa, MD, DNB.² 

¹Department of Dermatology, Venereology and Leprology, VMMC and Safdarjung Hospital, ²Rural Health Training Centre, Najafgarh, New Delhi, India.

ABSTRACT

Nail is a hard cutaneous structure; however, it is susceptible to external and self-induced injury that can lead to alterations in morphology. Self-induced nail disorders are a group of varied clinical manifestations that are caused by the patient voluntarily. They are classified as body-focused repetitive behaviour disorders (BFRBs). Common habits that lead to nail changes but are not associated with overt psychological abnormalities include onycholysis semilunaris, habit tic and onychophagia. The other major class includes nail disorders associated with psychiatric diseases, for example, onychodaknomania. These disorders often mimic a variety of nail conditions. Patients may not present to clinicians with these disorders as the primary complaint. An underlying psychiatric or psychological condition is often found, especially in adults. Hence, clinicians need to be aware of this clinical entity to be able to offer correct diagnosis and appropriate management. Multidisciplinary management is suggested, involving both non-pharmacological and pharmacological approaches. Behavioural interventions such as habit reversal therapy have a role in management. This article is aimed at analysing and presenting literature about these nail disorders to raise awareness. It discusses in detail various clinical entities, pathomechanisms, associated disorders and management.

Keywords: Nail tic disorders, Onychophagia, Onychotillomania, Habit tic deformity, Psycho-onychology, Nail

INTRODUCTION

Self-induced dermatoses include body-focused repetitive behaviours (BFRBs), which are defined as undesirable, repetitive motor activities. BFRBs include trichotillomania (TTM), skin-picking disorder (SPD), onychophagia, onychotillomania, dermatitis artefacta and features of other psychiatric disorders.^[1] Self-induced nail disorders (SINDs) are caused due to harmful actions such as biting, sucking, chewing, excessive trimming, pulling off, or filing of nail unit with instruments such as tweezers, files, and razor blades. Onychophagia (and onychotillomania) are categorised as 'Other Specified Obsessive-Compulsive and Related Disorders (OCRD)'. In the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), SPD, TTM and onychophagia, as a group, are referred to as recurrent BFRBs.^[2-5] No classification divides SINDs into those with psychiatric comorbidity and those without. For example, nail biting can be a part of normal habit in some individuals and can be associated with obsessive-compulsive disorders or tic-disorders in others. It is an area in need of further research. BFRBs are characterised by repetitive behaviours triggered by negative internal states, impaired response inhibition, and negative outcomes such as alopecia and skin

lesions. There are clinical similarities between BFRBs and the compulsions seen in obsessive-compulsive disorder (OCD). The symptoms of BFRBs indicate a compulsive nature. Grant and Chamberlain, in their study, concluded that compulsivity was linked to greater psychosocial dysfunction and lower quality of life in individuals with BFRBs.^[6]

SINDs are very common; hence, the clinical dermatologist needs to be aware, as they can mimic a vast number of cutaneous and nail diseases. It is not yet evident if BFRBs are associated with underlying sensory abnormalities.^[1,7] These clinical conditions are very stressful for the patient. An accurate diagnosis, involving careful history taking and physical examination, is crucial as patients seldom seek professional help for conditions like nail biting or nail picking.

Onychophagia is defined as compulsive nail biting and is classified in DSM-5 under OCRDs.^[5] Onychotillomania, or nail-picking disorder, involves patients repeatedly manipulating various parts of the nail unit^[8] and it falls within the spectrum of onychophagia, lichen simplex chronicus and prurigo nodularis in the skin. Managing SINDs requires a supportive and empathetic approach where the clinician refrains from confronting the patient about the

*Corresponding author: Shikha Bansal, Department of Dermatology, Vardhman Mahavir Medical College, Delhi, India. findshikha@gmail.com

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self-inflicted nature of the condition. Currently, there are no United States – Food and Drug Administration (USFDA) approved pharmacotherapies for self-induced dermatosis. The evidence is strongest for habit reversal therapy (HRT).^[1] This review focuses on clinical characteristics, psychiatric comorbidities, diagnosis and management of nail changes that are self-induced, with or without overt psychological abnormalities.

METHODOLOGY

A PubMed search pertaining to published articles using the keywords; Nail tic disorders, ‘Onychophagia’, ‘Onychotillomania’ and ‘Habit tic deformity’ and ‘nail’ were done. The search yielded 35, 9, 58 and 9 indexed English language articles, respectively. The articles related to the ‘Nail Unit’ in ‘dermatology’ were selected for further reading and abstracts were reviewed. These included various kinds of reviews and clinical research. Detailed methodology, clinical features, associated conditions and treatment options were collated and are summarised narratively.

TERMINOLOGY

A variety of terms have been used in literature to describe this group of disorders. Table 1^[2-4,9] summarises the different terminologies in vogue. The term ‘Self-induced nail disorders’ is being used in this article to comprehensively describe these varied clinical entities. Individual defined entities are discussed below.

ONYCHOLYSIS SEMILUNARIS

It is a frequently overlooked factitious nail disorder caused due to the habit of overzealous cleaning of subungual space. It results in the nail detaching from the nail bed, leading to a semilunar area of onycholysis. The condition is commonly seen in women, more rarely in men. Middle-aged women are mainly affected; however, it may be at times seen in teenage or older women.^[4] The patient aims to clean the subungual space with a sharp instrument, leading to damage to the local

area. The hyponychium serves as an empty recess beneath the nail plate, where dirt accumulates, prompting the patient to continue cleaning, hence aggravating the onycholysis.

This entity clinically presents as sharp, asymmetric distal onycholysis in the absence of any clinical signs of inflammation. The subungual space gradually extends backward/proximally; even more, dirt accumulates, and a vicious cycle is established. Commonly, 4–6 fingernails are affected, and one-third to one-half of each nail may get detached from the nail bed. True symmetrical half-moon is present less often, as either side is more often involved. At times, there is secondary colonisation by *Pseudomonas aeruginosa*, forming biofilms.^[3]

Differential diagnosis includes other causes of onycholysis. Nail psoriasis is the most difficult to exclude. Onycholysis in nail psoriasis has a reddish-brown proximal margin^[10], onycholysis semilunaris has a roller coaster transversal onycholysis.

Management involves counselling the patient regarding the patho-mechanism of this condition. This is often not accepted by the patient. They may also feel offended at such an implication. The onycholytic nail needs to be trimmed until its proximal point of attachment. Every month, it is crucial to trim the unattached portion of the nail to maintain proper care.^[4] Finger tips should be kept free of microbes through the application of antimicrobial creams twice daily. The patient needs to avoid sharp instruments and hard brushes. If the patient does not induce further trauma, the nail is expected to regrow normally.

HABIT TIC DEFORMITY

It is a type of nail dystrophy caused by habitual external trauma to the nail matrix, resulting in midline nail changes.^[11] It is typically observed in adults, and arises from a habitual tendency to push back the cuticle [Video 1]. The patient is not aware of this behaviour. The involvement of the thumbnail is classical, though any nail can be affected. Usually, the middle finger is involved in cases with single-nail involvement. Toenail

Table 1: Various terms used in literature to refer to nail disorders due to self-inflicted damage.

Term	Source	Description	Psychiatric aspect
Auto-aggressive nail disorders	Haneke, 2013 ^[2]	Repetitive auto-aggressive behaviour	Repetitive auto-aggressive behaviour related to obsessive-compulsive disturbances
Nail tic disorders	Singal and Daulatabad, 2017 ^[3]	Meaning of ‘tic’ is a persistent, recurrent, or repetitive behavioural trait that is difficult, if not impossible, to control voluntarily. When tics involve the nail unit, these are termed ‘nail tic’ disorders.	Examples of body-focused repetitive behaviours in which there is an irresistible urge or impulse to perform a certain behaviour
Psycho-onychology	Haneke, 2021 ^[4]	Psycho-onychology is a classic overlap between the specialties of psychiatry and dermatology.	Overlap between two specialties-Dermatology and psychiatry
Self-induced nail disorder	Starace <i>et al.</i> , 2023 ^[9]	A broad group of different clinical manifestations that share the common trait of being caused more or less voluntarily by the patient	They belong to the group of body-focused repetitive behaviour disorders. Psychiatric comorbidities present

involvement is rare, but reported.^[12] The pathomechanism of the condition is generally not accepted by the patient, who often assume nutritional or vitamin deficiency as the cause.^[2] This disorder is primarily a habit, characterised by an absence of anxiety before nail manipulation, and there is no relief following the act. It is less frequently associated with psychiatric comorbidities, such as OCD.^[3]

The patient presents with a 'central linear depression surrounded by parallel transverse ridges running from the proximal to the distal end'. The appearance is called 'washboard nails' due to its resemblance to a washboard. The cuticle is damaged, detached or absent, resulting in a loss of adhesion between the proximal nail fold and the nail plate. This exposes the distal matrix, giving it the appearance of a pyramidal lunula [Figure 1a and b]. Constant friction on the distal matrix leads to a loss of sheen over the nail plate. The nail's free margin may curve downward, giving it a claw like appearance. The thumb of the contralateral side pushes the nail fold back, and in one-sided cases, it can be the middle finger of the same hand. Proximal matrix may be exposed,



Video 1: Demonstration of habit tic deformity of great toenail by pushing back of the cuticle.

pterygium may occur, or lunulae may become hypertrophic in more severe situations.^[4]

Median nail dystrophy of Heller is the primary differential, which presents with similar clinical features, with several oblique ridges extending outward and proximally from the centre of longitudinal nail splitting, giving the appearance of a fir-tree^[13] [Figure 2a and b].

Cautious questioning and proper explanation are helpful in managing such patients. Local application of bland emollients, accompanied by gentle massaging from proximal to distal end, three times a day, has proven to be effective.^[4] In addition, using physical barriers such as bandaging or tape application on the proximal nail fold helps prevent additional trauma and give the nail matrix time to normalise. Ring *et al.*^[14] employed cyanoacrylate adhesive to restore the barrier between the proximal nail fold and the nail plate. Care should be taken lest contact sensitisation to glue develops. Benzethonium chloride has been successfully used for effective management of habit-tic deformity.^[15] N-acetyl cysteine, administered in a dose of 1800–2400 mg, has been shown to improve the condition.^[16]



Video 2: Demonstration of onychotillomania by picking off the nail plate and onychophagia in a podiatric age group patient.

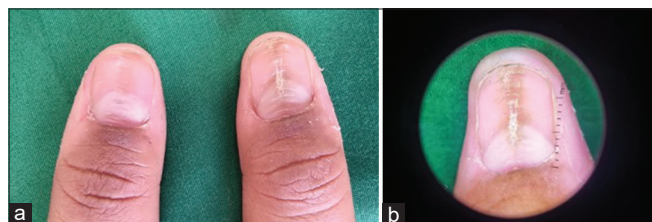


Figure 1: (a) Habit tic deformity: Clinical image showing yellow midline furrow, transverse grooves, macro lunula, absent cuticle, lichen simplex chronicus in proximal nail fold, periungual excoriations and haemorrhages. (b) Habit tic deformity: Onychoscopy – non polarised with DermLite 4 magnification $\times 10$: Showing longitudinal midline furrow, transverse furrows, branching grooves, macro lunula covering $\frac{1}{3}$ rd of the nail plate, absent cuticle, reddish proximal lunula and periungual scaling.

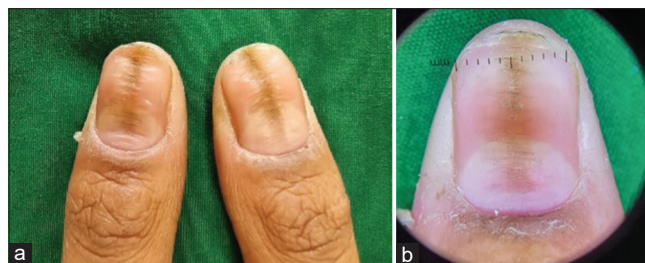


Figure 2: (a) Clinical image of median canalicular dystrophy of Heller-Thumb nails show longitudinal fir tree like dystrophy. (b) Non-polarised Dermoscopy with DermLite 4 Magnification $\times 10$ shows multiple transverse furrows arising from the centre of the nail and extending laterally.

Table 2: Proposed etiopathogenesis of onychophagia.

Authors	Pathogenesis proposed
Bohne <i>et al.</i> 2005 ^[21]	Psychoanalytic model: Suggests unresolved internal conflicts or suppressed aggression lead to nail-biting. Not empirically validated. Ethological (Abnormal Grooming) model: Conceptualizes onychophagia as an abnormal grooming behaviour, providing relaxation and stress relief through repetitive actions. Learning Theory (Operant Conditioning) model: Nail-biting is an acquired habit reinforced by negative reinforcement, where it reduces stress or anxiety. Opioid Release (Positive Reinforcement) model: The behaviour may be reinforced by the release of endogenous opioids, providing pleasure or relief. Hormonal Influences model: Hormones, such as those associated with puberty or menstruation, can trigger or worsen the behaviour. Stress Management (Dysfunctional Coping) model: Onychophagia acts as a coping mechanism to manage stress, offering short-term relief but leading to long-term negative consequences.
Ghanizadeh, 2009 ^[22]	Methylphenidate at a dose of 30 mg/kg caused nail biting in a case which decreased on decreasing the dose suggesting its role in pathogenesis

ONYCHOPHAGIA

Chronic biting of nail plate, nail folds, nail bed and/or cuticle is defined as onychophagia. The rate of nail-biting reduces as age progresses, even though some patients may have begun or continued the habit into adulthood.^[17] This condition affects up to 20–30% of the general population.^[18] It typically emerges in childhood, usually after the age of 3–4 years.^[19] Populations under stress are more prone to this behaviour. Video 2 demonstrates both onychotillomania and onychophagia in the same patient.

Onychophagia is classified under the subcategory of ‘OCRD’ in the DSM-5, in addition to lip biting and cheek chewing. DSM-5 further classifies onychophagia as a recurrent BFRB disorder.^[16] The association between onychophagia and OCD is inconsistent. Halteh *et al.*,^[18] found that only 25% of nail biters experienced comorbid OCD or anxiety disorder. Pacan *et al.*^[20] reported a prevalence of 3.1% for OCD among nail biters, which aligns with the lifetime prevalence in the general population. Onychophagia is more prevalent in individuals with personal or family history of psychiatric disorders. Onychophagia has a worse prognosis in adulthood. The patients may chew one or all nails. Skin picking and TTM are other OCDs that are often associated with onychophagia. There is a familial component, and social problems can aggravate the condition. Etiopathogenesis of onychophagia is discussed in Table 2.^[21,22]

Diagnosing nail biting is more difficult because the patient rarely presents to the physician with this as a primary complaint. Onychophagia is a common condition; however, the patient feels stigmatised, which leads to delays in seeking a medical opinion. The clinician needs to observe nail biting while talking to the patient, a non-judgemental way of taking history and examinations. This aspect is important to identify the disorder in its early stages. Clinically, the patient presents with short, uneven nails; hyponychium is distorted dorsally, forming a distal bulge. Over a period of time, there is a shortening of the nail bed. Presence of melanonychia, brittleness, macrolunula, transverse grooves and pterygium may be seen. The periungual skin shows linear and pinpoint haemorrhages^[23] [Figure 3a].

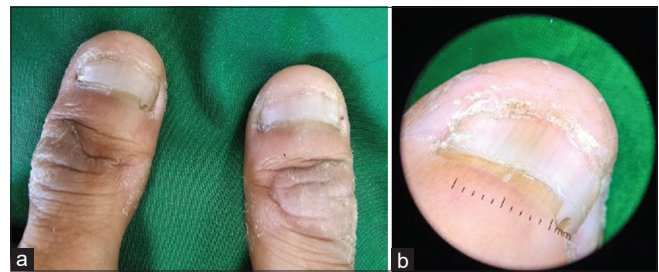


Figure 3: (a) Onychophagia: Clinical image showing brachyonychia, distal ragged edges, patchy rough areas, keratinisation of nail bed, loss of distal nail bed, hyponychial hyperkeratosis, ragged cuticle, periungual haemorrhage and excoriations. Excoriations over the distal part of both thumbs. (b): Onychophagia: Non-polarised dermoscopy with DermLite 4 magnification $\times 10$ showing ragged distal edges, periungual scales, red brown streaks, periungual haemorrhage and scaling, traumatic onycholysis.

Usually, fingernails are involved more often in comparison to toenails. It is physically more difficult to bite toenails; they are harder, and toenail biting may suggest a possible association with psychiatric comorbidity.^[24] Table 3^[23,25-26] summarises nail changes observed by various studies. Table 4^[25-60] shows various studies conducted on onychophagia.

Onychoscopy shows ‘loss of nail plate along with a ragged distal borders,^[23] [Figure 3b]. Histopathology is often not needed; however, it can be done if we need to rule out other differentials. Entrapped red cells and trauma-focal hyperkeratosis are common findings on nail biopsies. Features can mimic other conditions including chronic paronychia, onychotillomania, nail psoriasis and nail lichen planus.^[18]

Complications due to onychophagia can affect both the nail unit and the oral cavity. Chronic trauma leads to partial or complete loss of the nail plate that exposes the nail bed and leads to keratinisation of the exposed area, with subsequent irreversible nail shortening. Consequent to chronic trauma and friction, there is activation of melanocytes that clinically present as melanonychia. Multiple nails may be affected by the presence of grey-brown longitudinal bands that vary in width.^[26] Acute and chronic paronychia may occur in

Table 3: Various nail changes reported in patients with Onychophagia.

Study	Nail findings
Baran, 1990 ^[25]	Longitudinal melanonychia
Anolik <i>et al.</i> , 2012 ^[26]	
Fiçicioğlu and Korkmaz, 2018 ^[27]	Longitudinal melanonychia. Splinter haemorrhages, Punctate leukonychia, Pterygium inversum unguis
Shin <i>et al.</i> , 2021 ^[23]	Short nails with ragged cuticle, Generalised or patchy rough area, Linear and pinpoint haemorrhages, Longitudinal melanonychia, Transverse grooves, Brittleness, Macrolunula, Wash-board nails, Pterygium, Periungual complications including Exfoliation, hyponychial hyperkeratosis, and paronychia

Table 4: Summary of studies conducted on Onychophagia.

Study	Type of Study	Population	Design	Salient Results	Conclusion
Coleman and Mccalley, 1948 ^[28]	Questionnaire	1000 college students	Questionnaire, Bernreuter Personality inventory, Personal Data Sheet used	29.3% (M) 19.3% (F) nail biters	Nail biters were not found to be neurotic or introverted. More women had given up nail-biting.
Bakwin, 1971 ^[29]	Family Survey	338 twin pairs	Interview, telephone calls, Mail Questionnaire	203 twin pairs were nail biters aged 6–18 (9) years. More in Monozygotic twins, females and those with a history of nail-biting in parents.	The genetic basis of nail-biting exists.
Klatte and Deardorff, 1981 ^[30]	Psychological report	20 (10 biters and 10 non-biters)	Case-control study. Taylor's manifest anxiety score used	The significant difference in mean Taylor score in biters and non-biters	Nail biters are more anxious
Baran, 1990 ^[25]	Case series	6 cases (2 of onychophagia)	Case series	LM seen with onychodystrophy	Pressure damage to the base of the nail causes stimulation of melanocytes causing LM.
Waldman and Frieden 1990 ^[31]	Case report	5 years boy	Case report	Periungual maceration, fissuring, periungual erythema, cellulitis, sausage-shaped digit, 75% nail absent and exposed nail bed. X-ray showed marked resorption of terminal tuft consistent with osteomyelitis.	Onychophagia can present as osteomyelitis in chronic nail biters
Newfield <i>et al.</i> , 1996 ^[32]	Case report	1 patient with IDDM and nail-biting	Case report	14 years old with IDDM and chronic nail biting presented with complex felon and necrosis, requiring iv antibiotics with debridement, resulting in shortening of digit	<i>Eikenella corrodens</i> is a commensal in the human oral cavity and can cause disease in immunocompromised individuals
Krejci, 2000 ^[33]	Case report	8 years old African American male	Case report	Gingival swelling due to retention of fingernails caused by chewing	Fingernail chewing can cause self-inflicted gingival damage

(Contd...)

Table 4: (Continued).

Study	Type of Study	Population	Design	Salient Results	Conclusion
Jabr, 2005 ^[34]	Case report	60 years old man	Case report	All 10 nails were irregular with nail plate shedding, scarring and granulation tissue. History of nail-biting after retirement	History of nail-biting in all cases with severe nail deformity should be taken.
Williams <i>et al.</i> , 2007 ^[35]	Analogue assessment study	40 undergraduate students with nail-biting	Randomised allocation to 4 groups signifying boredom, frustration, contingent attention, and non-contingent attention	Nail biting occurred most commonly in boredom and frustration	Nail biting in young adults occurs as a result of boredom or working on a difficult problem. Least often in social interaction or when reprimanded for behaviour
Baydaş <i>et al.</i> , 2007 ^[36]	Case-control	25 nail biters versus 34 controls	Salivary samples compared microbiologically	A statistically significant difference in the prevalence of <i>Escherichia coli</i> and Enterobacteriaceae	Enterobacteriaceae is more prevalent in the oral cavities of nail-biting children
Ghanizadeh, 2008 ^[37]	Original research	450 referred children, of which 63 had a nail-biting	Interview according to DSM IV criteria	The most common comorbid psychiatric disorders were ADHD, oppositional defiant disorder, separation anxiety disorder and enuresis. Parents also had depression.	Nail biting is common and should be routinely checked for in mental healthcare settings.
Dutau <i>et al.</i> , 2011 ^[38]	Case report	47 years old	Case report	Left main stem bronchus obstruction because of toenail fragment	Tracheobronchial foreign body aspiration should arouse a high index of suspicion of onychophagia
Egido and García, 2011 ^[39]	Neuro Image	34 years	Case report	Left MCA stroke due to ipsilateral internal dissection with asymmetric self-nail-biting.	Hemionychophagia occurred due to right-sided neglect.
Anolik <i>et al.</i> , 2012 ^[26]	Case report	13 years old healthy girl	Case report	Longitudinal pigmented bands on multiple nails with onychophagia	Onychophagia can induce longitudinal melanonychia
Michopoulos <i>et al.</i> , 2012 ^[40]	Case report	66 years old man	Case report	Mutilating fingers for 6 years started as nail biting with diabetic neuropathy and brain atrophy. Treated with low-dose haloperidol and fluoxetine.	Self-mutilating behaviour associated with severe diabetic neuropathy, impulsivity and social isolation.
Van Tongel <i>et al.</i> , 2012 ^[41]	Case report	39 years old lady	Case report	Pain and swelling of the fifth finger. X-ray and surgical excision suggestive of epidermoid cyst.	Intraosseous epidermoid inclusion cyst is a rare complication of nail-biting.

(Contd...)

Table 4: (Continued).

Study	Type of Study	Population	Design	Salient Results	Conclusion
Alessandri Bonetti <i>et al.</i> , 2012 ^[42]	Case report	2 healthy post orthodontic cases	Case report	Isolated type recession defects in two post-orthodontic patients caused by habitual onychophagia	Indirect bone dehiscence and gingival recession can occur due to onychophagia in post-orthodontic patients.
Nino and Singareddy, 2013 ^[43]	Case report	47-year-old man with a history of quadriplegia due to C5 spinal cord injury.	Case report	Man with severe onychophagia and finger mutilation, which completely resolved after management of OSA with BiPAP.	Possible correlation between sleep physiology and neurobiological circuits implicated in impulse control behaviour possibly via dopamine pathway.
Reddy <i>et al.</i> , 2013 ^[44]	Case-control study	122 cases and controls of chronic nail biters and non-biters age 11–15 years.	Assessed for prevalence of Enterobacteriaceae in saliva samples collected by oral rinse method.	Enterobacteriaceae was detected in 80/122 nail-biting subjects compared to 10/122 non-nail-biters (statistically significant difference).	Higher carriage of Enterobacteriaceae in individuals with nail-biting habits.
Sharma and Sommerdyk, 2014 ^[45]	Letter to the editor	28 years old female with bipolar disorder	Case report	After starting lithium for bipolar disorder for 2 months, chronic nail biting stopped.	Lithium may be beneficial in nail-biting with bipolar disorder.
Ellison <i>et al.</i> , 2014 ^[46]	Case report	14 years old Caucasian male	Case report	Chronic apical pathology affecting the incisor and crowding of his upper arch because of fingernail	Subgingival foreign body embedment is a complication of nail biting.
Motghare <i>et al.</i> , 2015 ^[48]	Descriptive cross-sectional study	240 adolescents in school (10–19 years)	Questionnaires by the American Academy of Orofacial pain	Nail biting was the most common habit and was associated with temporomandibular disorder.	Nail biting may cause temporomandibular disorder as a complication.
Khumalo <i>et al.</i> , 2016 ^[47]	Case series	4 generations affected by including nail biting	Case series	Individual members suffered from trichotillomania, skin-picking disorders, and nail biting with no known psychiatric disorders	Possible genetic and familial risk factors for BFRBDs
Lynch <i>et al.</i> , 2016 ^[49]	Population-based prospective birth cohort study	1037 study participants	Follow-up assessments were completed at ages 3, 5, 7, 9, 11, 13, 15, 18, 21, 26, 32 and 38 years. Atopic sensitisation was done by skin prick test first at 13 years and then at 32 years.	Parents reported thumb-sucking and nail-biting habits when children were aged 5, 7, 9 and 11 years. 31% of children were frequent thumb suckers or nail biters and had lower risk of atopic sensitisation.	Children who suck their thumbs or bite their nails are less likely to have atopic sensitisation in childhood and adulthood.

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Table 4: (Continued).

Study	Type of Study	Population	Design	Salient Results	Conclusion
Gür <i>et al.</i> , 2018 ^[50]	Quasi- experimental study	299 primary school students	Pre- and Post-test and interrupted time series design aimed to demonstrate the effect of a program called 'Do not Bite your nails, cut your nails' based on a health promotion model.	Program significantly diminished nail-biting rate.	Health promotion model helped change nail biting habit in primary school students
Morais <i>et al.</i> , 2018 ^[51]	Scientific letter	27 years old woman	Case report	Post-prandial vomiting with significant weight loss due to granulomatous gastritis due to onychophagia.	Granulomatous gastritis as a complication of onychophagia.
Fiçicioğlu, 2018 ^[27]	Case report	20-year male	Case report	Dermoscopy showed longitudinal melanonychia, splinter haemorrhage, punctate leukonychia, etc.	Dermoscopy can be helpful in diagnosis of onychophagia.
Dev <i>et al.</i> , 2019 ^[52]	Case report	11 years old boy with onychophagia for 2 years.	Case report	Successful treatment with intraoral fixed habit breaker appliance.	Innovative intraoral fixed appliances can intercept habits and prove beneficial in the long run.
Ghanim <i>et al.</i> , 2020 ^[53]	Case report	10 year old boy	Case report	The fingernail is removed from the lingual aspect of the gingival sulcus.	Foreign bodies in the mouth secondary to onychophagia are common.
Oh <i>et al.</i> , 2020 ^[54]	Original article	681 elementary school students	Cross-sectional study. Children are divided into non-NB, occasional NB and frequent NB based on child behavioural checklist.	Internalising, externalising, anxious/depressed withdrawn/depressed, rule-breaking and aggressive behaviour are most frequent and severe in the NB group.	Children with NB reported significantly more problematic behaviours
Pagacz <i>et al.</i> , 2020 ^[55]	Case report	49-year-old woman on chemotherapy for hepatic metastases.	Case report	Abdominal pain due to acute appendicitis revealed nail encased in actinomyces on appendicectomy.	Foreign body appendicitis is a complication of onychophagia.
Teich <i>et al.</i> , 2020 ^[56]	Case-control study	918 IBD cases and their siblings without IBD	32 questions questionnaire, with the prevalence of thumb sucking and/or nail biting determined.	In the study, 65% of the patients were female, with 57% diagnosed with CD. Nearly 49% of patients with IBD reported thumb sucking or nail biting seen more in CD.	Common oral habits do not protect against IBD. challenging hygiene hypothesis.

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Table 4: (Continued).

Study	Type of Study	Population	Design	Salient Results	Conclusion
Hsueh and Chen, 2022 ^[57]	Retrospective observational study	The study involved 535 TS patients, 230 with provisional tic disorder and 1,460 healthy controls aged 4–18	The presence of nail biting, starting age for nail biting and starting age for motor and/or vocal tics was noted via records.	Nail biting was more common in patients with TS. It started earlier than tics in TS patients, and those with ADHD began nail biting later than those without ADHD.	Nail biting was more prevalent and occurred earlier than tics in patients with TS, regardless of ADHD status, in the study population.
Cohen, 2022 ^[58]	Case series	Three patients had nail-related repetitive behaviours: Habit-tic, nail biting and nail/skin picking.	Case reports	Patients sought medical evaluation for unrelated issues; nail dystrophy and skin picking were incidental findings. Most patients, including men, declined behavioural interventions.	Nail-focused repetitive behaviour can be managed with physical methods, behavioural modifications and/or medications.
Otsugu <i>et al.</i> , 2023 ^[59]	Observational study	503 Japanese children (258 boys and 245 girls 3–6 years).	Occlusal traits, lip seal, oral habits and nasal/throat conditions were assessed visually and via a questionnaire.	In this study, 62% of pre-schoolers had malocclusion, 27.8% had incompetent lip seal, 18.9% had nail biting and 30.4% had nasal obstruction. Lip seal was linked to malocclusion and negatively to nail biting.	Incompetent lip seal is significantly associated with malocclusion, but nail biting may not necessarily be a deleterious habit for occlusion in Japanese preschool children.
Tan <i>et al.</i> , 2024 ^[60]	Letter to editor	29 years Caucasian woman with chronic onychophagia and onychotillomania.	Case report	The patient's nail-picking and biting, triggered by family trauma, improved after 8 months of psychodynamic therapy, mindfulness, nail care and nail art. Progress was maintained at follow-up.	The case emphasises psychodynamic therapy's role in addressing emotional roots and supports an integrative approach for lasting reduction of severe body-focused repetitive behaviours.

LM: Longitudinal melanonychia, IDDM: Insulin depended diabetes mellitus, OSA: Obstructive sleep apnoea, BiPAP: Bilevel positive airway pressure, BFRBD: Body focussed repetitive behaviour disorders, IBD: Inflammatory bowel disease, CD: Crohn's disease, NB: Nail biters, TS: Tourette syndrome, ADHD: Attention deficit hyperactivity disorder

patients as cutaneous trauma induced due to onychophagia can provide portal of entry for bacteria [Figure 4]. Chronic paronychia can also occur, presenting with loss of cuticle and erythematous inflamed nail folds due to chronic friction and trauma. Patients can also develop other infections including herpetic whitlow and periungual warts^[48,61,62] [Figure 5]. Oral and dental complications include incisor wear and tear,

maloccluded teeth, incisor rotation and apical root absorption. There can be gingival injury causing swelling and abscess. Chronic nail biters may experience pain and dysfunction in the temporomandibular joint.^[48] Enterobacteriaceae family frequently colonises the oral cavity. *Enterobacter* spp. and *Escherichia coli* are commonly seen in onychophagia patients, predisposing them to local and systemic infections.^[36,63]



Figure 4: Acute paronychia along with damaged proximal nail fold.

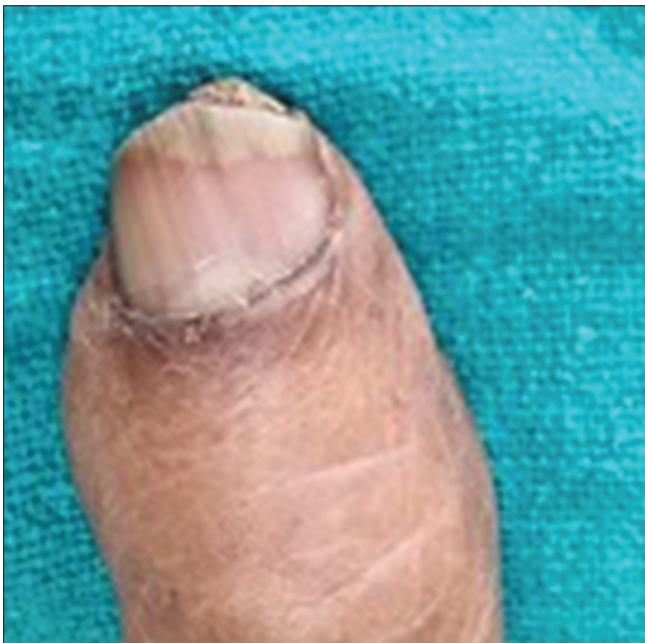


Figure 5: Shortened nail plate, hyperpigmented proximal nail fold suggestive of chronic handling along with subungual wart.

The management is multidisciplinary, including pharmacotherapy (either alone or in combination), habit reversal training, counselling, and stimulus control. Most importantly a

supportive and empathetic attitude where the clinicians avoid confronting the patient about the self-inflicted nature of the disorder. Pharmacotherapy, whether used alone or in combination, is commonly employed for treatment.^[16] Stimulus control procedures aim to minimise external triggers that make nail biting difficult, along with incorporating aversion therapy. Prevention of nail filing and trimming of splintered cuticles can lead to a reduction in nail-biting temptation. Professional manicures done for the beautification of nails can help motivate patients to preserve their beautiful nails. Application of gel nail helps harden the free edge that cannot be bitten off. Glove bandages, though acting as a physical barrier, can be embarrassing for the patient to use socially. They also lead to a reduced sensation of fingers, hampering daily activity.

Aversion therapy involves repeatedly pairing unwanted behaviour with discomfort to help break the habit. For example, the application of an unpleasant-tasting nail polish interferes with the enjoyable aspect of nail biting. It is often avoided in young children, as it may lead to increased biting behaviour in order to gain attention.^[64] Removable nail polishes are effective alternatives for those who are non-compliant with aversion therapy. They may encourage long-term behavioural change.^[65]

Cognitive behavioural and HRT, have the strongest evidence for the treatment of BFRBs. For HRT to be effective for the patient's self-injurious behaviour, the technique involves replacing harmful urges with less harmful competing responses. Cognitive behavioural therapy (CBT) encompasses methods such as habit reversal training, the comprehensive behavioural intervention of tic and neurofeedback. Habit reversal training includes five exercises, the first one being awareness training, which helps the patients recognise their feelings, environment, frequency and high-risk situations when they tic. Relaxation training teaches the patients to manage the stress they experience. Competition training involves helping patients to develop a new habit to prevent the onset of tic. Motivation training aims to enhance the patient's intrinsic motivation, while generalisation training helps the patient mentally rehearse controlling tics before they occur. Three components of HRT include social support, competing for response training and awareness training. Awareness training involves patients saying aloud or writing triggers for nail biting and the negative consequences. When a patient is made conscious of nail biting, competing response training can occur. When the patient has the urge to bite, they clench their fist, clap or sit on their hands to prevent the act.^[66]

Pharmacotherapy is the second-line treatment for onychophagia. As of now, no USFDA approval has been given for pharmacotherapy for BFRB's however, certain medications are helpful for the management of onychophagia. N-acetylcysteine (NAC), a glutamate modulator, has been used for impulse control disorders

including onychophagia.^[16] Excessive levels of glutamate, a key excitatory neurotransmitter in the central nervous system, can lead to neuronal damage and have been linked to various repetitive and compulsive disorders. NAC mitigates glutaminergic hyperactivity by facilitating the release of glutamate into extracellular space. In addition, NAC possesses antioxidant properties through the production of glutathione, a powerful antioxidant. It is typically administered in a dose of 600–3000 mg/day without, any reported side effects.^[9] Selective serotonin reuptake inhibitors (SSRIs), bupropion, and lithium had been reported to be successful in single case reports.^[45,67-69] Clomipramine, lamotrigine, olanzapine, inositol and naltrexone have also been used.^[2] Despite encouraging outcomes, there is limited information regarding the effectiveness of NAC and antidepressants in treating onychophagia. Larger clinical trials are needed to make conclusive statements.

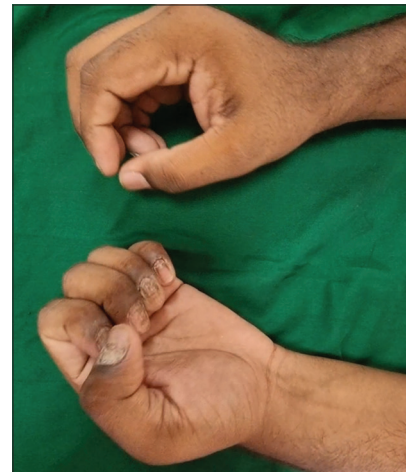
ONYCHOTILLOMANIA

It is characterised by ‘recurrent picking or pulling of the nail unit that damages the periungual skin, nail matrix, nail bed and nail plate’. It is a self-induced condition that involves the patient’s fingers and nails, although tools such as scissors, nail files and knives may also be used.^[70] Videos 3-5 demonstrate onychotillomania involving various parts of the nail unit. Onychotillomania is categorised alongside other BFRBs, including onychophagia, TTM and excoriation disorder. It may fall under ‘other specified obsessive-compulsive and related disorders’ specifically within the subsection of BFRBs. It is less recognised and less reported as compared to TTM and excoriation disorder, resulting in less attention in psychiatric literature.^[1] Comorbid psychiatric disorders often include depression, anxiety and psychosis.^[16] Some authorities consider habit tic to be a variant of onychotillomania. Additional related nail behavioural disorders include onychotemnomania (cutting nails excessively short) and onychoteiromania (rubbing nails against a hard piece or with a wooden file to smoothen the nail remnants).

Nail picking is rarely a primary complaint, with patients often diagnosed during routine examinations. A feeling of anxiety before and a sense of relief after nail picking has been reported in patients. In patients of TTM, a thorough examination of all 20 nails as well as skin, scalp and hair is essential along with an assessment for coexisting BFRBs. Given that onychotillomania is associated with depression, anxiety and psychosis, a brief psychiatric examination should be done. Clinical findings are frequently asymmetric and non-specific, with nail plate abnormalities such as transverse ridging, thinning, macrolunula and generalised dystrophy. Repeated trauma to the nail matrix from picking of proximal nail folds can lead to nail plate ridging. Habit tic deformity can be associated with onychotillomania. Periungual skin can be erythematous, inflamed, crusted and erosions can be present^[8] [Figure 6a].



Video 3: Demonstration of rubbing of proximal nail fold leading onto lichenification and dystrophy of nail plate.



Video 4: Demonstrates nail plate dystrophy, loss of cuticle and damage to nail folds in all finger nails due to constant rubbing.



Figure 6: (a) Onychotillomania: Clinical image showing transverse wavy lines, periungual/subungual haemorrhages, chromonychia, melanonychia, onychorrhexis, lichen simplex chronicus in proximal nail-fold, anonychia and dystrophy. (b): Onychotillomania: Non-polarised dermoscopy with DerMLite 4 magnification $\times 10$ showing nail plate scaling, wavy lines, periungual haemorrhage and scaling, hang nails, longitudinal melanonychia and chromonychia.

Onychoscopy can help differentiate onychotillomania from other nail conditions. Maddy *et al.*^[71] reported ‘wavy lines



Video 5: Demonstrates damage to periungual skin in form of haemorrhages due to manipulation of periungual skin.

(uneven longitudinal lines in different planes with a wavy appearance from uneven nail plate growth, obliquely placed nail bed haemorrhages and nail bed grey discoloration)' [Figure 6b]. A nail biopsy is seldom needed to make a diagnosis. It is indicated in severe cases of nail dystrophy without any other clues in history. The findings include epithelial hyperplasia, acanthosis and hyperkeratosis.^[8]

Differential diagnoses include onychophagia, onychomycosis, and inflammatory disorders of the nail unit, including nail lichen planus and nail psoriasis, trachyonychia and paronychia. Long-term nail picking and manipulation of nail units can lead to complications such as permanent nail dystrophy. Melanocyte activation can occur due to trauma to the proximal nail fold. These changes are permanent even after cessation of the condition.^[25] Superimposed bacterial and viral infections, including acute bacterial paronychia, herpetic whitlow and periungual warts, may also occur, along with chronic paronychia, pterygium and anonychia.^[72]

Non-pharmacological treatment options rely on supportive measures. The use of bandages and other occlusives has been found to be useful.^[73,74] If bandages are found unacceptable by the patient socially, cyanoacrylate glue can be used twice a week over the cuticle, to serve as a physical barrier against picking.^[14] Behavioural modification using CBT can help the patient like in other BFRBs.^[75] There are currently no published trials focusing on pharmacologic treatment of onychotillomania. NAC may be tried as it has been found useful in other BFRBs. However, there is no published literature in onychotillomania. In patients with comorbid psychiatric illnesses such as depression, OCD and psychosis, psychotropic drugs including SSRIs, tricyclic antidepressants and typical antipsychotics have proven useful.^[16]

ONYCHOTEMNOMANIA

This involves cutting nails too short, leading to secondary trauma. Patients may use scissors, blades or knives to go till the

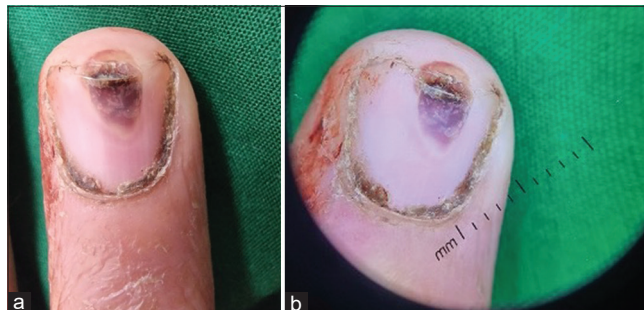


Figure 7: (a) Onychotemnomania: Clinical image showing wedge-shaped subungual haemorrhages, pus points, traumatic onycholysis, shiny nail plate, periungual haemorrhage and excoriations. (b) Onychotemnomania: Non-polarised dermoscopy with DermLite 4 magnification $\times 10$ showing Subungual and periungual haemorrhage, subungual puspoint, onycholysis, splinter haemorrhages, ragged nail folds and absent cuticle.

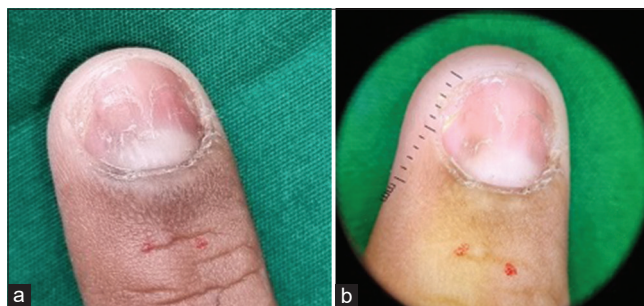


Figure 8: (a) Onychoteiromania: Clinical image showing thinned out nail plate, nail plate scaling, dystrophy, lichen simplex chronicus (LSC) in proximal nail fold, nail plate and periungual haemorrhages. (b): Onychoteiromania: Non-polarised dermoscopy with DermLite 4 magnification $\times 10$ showing melanonychia, red streaks, wavy lines, scaling, periungual haemorrhage and scaling.



Video 6: Demonstrates onychoteiromania due to constant rubbing of nail surface against a hard surface.

far proximal end of nails. Clinically, the patient has extremely small nail plates with exposed distal edges [Figure 7a and b].

ONYCHOTEIROMANIA

This condition refers to the presence of very thin nails that crack easily due to excessive filing or rubbing of the nail

surface. Patients can file the nail folds and in extreme cases, they may reach the nail bed epithelium^[4] [Figure 8a and b]. Video 6 demonstrates onychoteiromania.

Table 5: Various non-pharmacologic treatment modalities for SIND.

Method	Disorder	Study methodology	Number of patients	Comments
Cyanoacrylate glue ^[14]	Habit tic deformity	Application of glue 1–2 times/week at proximal nail fold and cuticular sulcus to recreate absent cuticles for 3–6 months.	2	Provides an obstacle to picking behaviour and artificial cuticle provides a barrier to further insult.
Intraoral fixed appliance ^[52]	Onychophagia	Successful treatment with intraoral fixed habit breaker appliance.	1	Appliance can intercept habits and prove beneficial in the long run
NrR wristbands vs. mild aversion therapy ^[65]	Onychophagia	NrR wristbands vs. mild aversion therapy (applying bitter-tasting polish twice a day)	80	NrRs can be used as an alternative treatment for patients who have noncompliance with aversion therapy, producing lasting change in behaviour.
4% quinine in Petrolatum, 1% clindamycin, or quaternary ammonium derivatives ^[79]	Onychotillomania	Review article	NA	Distasteful preparations applied on the nail fold may discourage nail biting and chewing.
Olive oil ^[80]	Onychotillomania	Review article	NA	Decrease biting behaviour by making the nail feel softer without causing distress to the child.
Nail strengtheners and Nail art therapy ^[60]	Onychophagia	Case report	1	Grooming provides healthy outlet and increases nail structural elasticity, making nails less prone to breakage.
Intralesional steroid ^[81]	Onychotillomania	Case report	19 years old female.	An injection of 0.2 mL of 5 mg/mL triamcinolone acetonide was given monthly for 3 months and then bimonthly for 8 months.

SIND: Self-induced nail disorders, NrR: Non-removable reminders, NA: Not applicable.

Table 6: Systemic treatment used in management of SIND.

Drug used	Disorder	Authors	Type of study	Number of patients, dose, duration	Level of evidence
NAC	TTM with onychophagia	Odlaug and Grant, 2007 ^[82]	Case report	NAC (1800 mg/day) leading to resolution of both disorders.	5
NAC	Onychophagia	Berk <i>et al.</i> , 2009 ^[83]	Case series	Three cases with depression and BPD showed nail-biting improvement using NAC 1000 mg BD. Complete cessation after 7 and 4 months in two cases, and reduction after 28 weeks in the third.	4
NAC	Onychophagia	Ghanizadeh and Derakhshan, 2012 ^[84]	Case report	An 8-year-old male with autism, on Risperidone and thioridazine, showed reduced nail biting and autism symptoms after 1 month of NAC treatment at 800 mg/day.	5
NAC	Nail biting	Ghanizadeh <i>et al.</i> , 2013 ^[85]	A Placebo-controlled RCT	In a 2-month trial with 42 children, NAC 800 mg daily showed superiority over placebo after 1 month, but no differences at 2 months.	3

(Contd...)

Table 6: (Continued).

Drug used	Disorder	Authors	Type of study	Number of patients, dose, duration Comments	Level of evidence
NAC	Onychophagia	Kiliç and Keleş, 2019 ^[86]	Case report	NAC (1800 mg/day) for 3 weeks, the patient lost the urge to bite his nails. Efficacy was maintained after 6 weeks with reduced dosage.	5
Fluoxetine	Self-mutilating behaviour	Velazquez <i>et al.</i> , 2000 ^[68]	Case report	Single patient-fluoxetine (20 mg) for 5 months to follow-up after that. Responded well to a SSRI for finger-chewing and dysthymia	5
Clomipramine vs. Desipramine	Severe onychophagia	Leonard <i>et al.</i> , 1991 ^[87]	Double-blind cross-over trial	A 10-week trial with 25 subjects Clomipramine significantly outperformed over desipramine in reducing severe onychophagia.	3
Lithium	Bipolar disorder and onychophagia	Sharma and Sommerdyk, ^[45]	Case report	Lithium led to a serendipitous cessation of chronic nail biting, suggesting its potential benefit.	5
Amitriptyline and thioridazine	Onychotillomania	Ameen Sait <i>et al.</i> , ^[88]	Case report	Case 1: 55 year male, 1 year duration on 50 mg amitriptyline Case 2: 84 male, 6 month duration with trichotillomania, put on 200 mg thioridazine for 1 month.	5
Sertraline	Onychotillomania	Grzesiak <i>et al.</i> , ^[89]	60 years old male	60 years old male with depression, onychophagia and onychotillomania. Started on sertraline 50 mg daily and increased to 150 mg daily. Improved after 4 weeks. After 6 weeks, depressive symptoms and onychotillomania seized.	5

NAC: N-acetyl-cysteine, SIND: Self-induced nail disorders, TTM: Trichotillomania, BPD: Borderline personality disorder, RCT: Randomised controlled trial

Bidet nails are a variant of onychotillomania.^[76] The free margin of the nail is rubbed against a surface leading to a distal triangular defect of the nail plate. The nail defect is reportedly acquired secondary to rubbing against the glazed earthenware of the bidet. There is involvement of the 2nd, 3rd, and 4th fingers of the dominant hand. Onychoscopy shows the presence of dilated capillaries and pinpoint haemorrhages. Majority of the patients have been reported to have obsession with excessive cleanliness.^[77]

ONYCHODAKNOMANIA

It is a rare entity where the patient bites their fingernails between their teeth, typically using premolars and canines. This self-mutilating behaviour is extremely painful^[78] and is often associated with an underlying psychiatric disorder. As a result, it can lead to the formation of irregular and deep depressions and surface irregularities. Patients may respond to a multidisciplinary approach and pharmacotherapy with combination therapy of anti-psychotics and anti-depressants.^[40]

Various non-pharmacological and pharmacological treatment options used in the management of SINDs are summarised in Table 5^[14,52,60,65,79-81] and Table 6,^[45,68,82-89] respectively.

FUTURE DIRECTIONS

Dermatologists need to be aware regarding SIND's so that they can identify the condition and offer appropriate diagnosis and management. Standard protocols need to

be developed with regard to the referral of a patient to a psychiatrist or psychologist. These disorders lead to significant psychological and physical morbidity; hence, larger clinical trials are needed to develop effective therapy.

CONCLUSION

Self-inflicted nail damage is more common than generally reported or anticipated. SIND's are auto-aggressive disorders, mimicking various nail disorders. Most patients do not acknowledge the fact that they suffer from any such disorder. They deny the diagnosis and aetiology and most often do not even present with the primary complaint of these conditions. It is important for the clinician to be aware of these entities to make a correct diagnosis, suspect underlying psychiatric comorbidity and thereby offer appropriate treatment options. Psychotherapy can be beneficial for mild-to-moderate conditions, whereas medication can be used in severe cases.

Authors' contributions

Shikha Bansal: Contributed by conceptualising, data search, manuscript preparation, contributing images and editing, Prathibha Kuchana: Data research, Manuscript preparation, editing, preparation of legends and references, Dhaarna Wadhwa: Data research, tables preparation.

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The Institutional Review Board approval is not required.

Declaration of patient consent

Patient's consent was not required as there are no patients in this study.

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Dr. Shikha Bansal is on the editorial board of the Journal.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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